

Comparing Renewable Energy Policies in the European Union and Turkey

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Abstract

The European Commission's policy on "climate change and energy" under the Renewable Energy Directive is an important part of the European Commission policies. As a target, the Commission wants its member countries to increase total energy consumption from renewable energy sources to 20% in the European Union (EU) by 2020. This means, any country which is interested in joining the EU should adhere to its policies and conditions regarding energy consumption. In this paper, firstly, we study the trend of renewable energy consumption in the EU. Data illustrate that the EU region, as a whole, is near its goal, although some members still have to work more or undertake reforms to reach the 20% renewable energy target. Secondly, the renewable energy condition in Turkey, a country that has been preparing in the past decade to join the EU, is surveyed. Based on the results, Turkey needs to pay attention to new renewable resources in order to reach the EU's target.

Keywords: renewable resources, European Union, energy policies, climate change and energy

1. Introduction

The European Commission makes decisions that affect the global community. There are many plans and programs in various areas (such as budget, energy, climate change, and transportation), which address the existing situation and outline future plans and strategies to meet set targets. Today, energy policies are considered among the most important policies in the EU¹. In turn, climate changes and energy can be very important for EU countries for various reasons. Firstly, energy supply security has forced the member states to discover existing domestic energy sources or decrease imported supplies. Secondly, the price of energy can create financial problems for some governments. Lastly, environment and greenhouse gas emission pose problems to the world as well as the EU. Energy policies affect economic variables. In other words, changes in energy resources can play positive or negative roles in an economy, the most important being their contribution to GDP. Moreover, energies based on consumption are divided into oil, gas, nuclear and renewables (including solar, wind, etc.) and all of them can be used in different parts of the economy; renewable energy sources, especially, can affect certain variables because they are cleaner and cheaper and relatively free comparison to the others. Renewable energy, according to the International Energy Agency (IEA), is energy that comes from natural sources (such as sun and wind) and is returned to the environment faster than it is consumed (IEA, Executive Summary, 2013).

Some subjects such as global growth, population and productivity growth, energy consumption, renewable energy policy, and energy sources statements affect future conditions (British Petroleum (BP), 2016, p.1). In this paper, after reviewing the European Commission 2020 targets, the current situation of renewable energy use in the EU is studied. After that, we survey the trend of renewable energy in Turkey, a country that wants to join the EU. Lastly, energy consumption is compared between Turkey and the EU and some suggestions for Turkey are presented.

2. Importance of Energy

After World War II, energy was considered one of the key factors of production in industrialized countries, and it influenced economic development. Energy imports had a considerable effect on the balance of payments in energy consuming countries (Stevense, 2000). In the 1970s, the cost of energy had a significant effect on

¹In this paper, EU refers to EU28.

inflation rates and many countries' competitive positions changed internationally (Jones et al, 2004, p.15). Therefore, in recent decades, having a reliable and sustainable energy supply has been one of the key challenges facing industrialized countries.

There are two opinions in the energy sector; some economists believe that the expansion of a free market system is a good idea in all markets, including the energy market, resulting in efficient performance in all respects. This line of thinking explains energy markets, as well as other commodities markets, based on the principles of economics. This approach considers all commodities (including energy) as being similar. Unfortunately, many of these economists have limited knowledge of the realities of the energy market, especially the international oil industry, and they lack understanding in their analysis of the oil market. In contrast, another group of economists thinks that, according to the characteristics and realities of the energy market (especially the role of the oil industry and the pivotal importance of energy supply in the economy) the world can be divided into different blocks of economic and political powers that compete to gain a greater share of energy resources for their economic and political goals (Correlje and Linde, 2006, p. 533).

In other words, the energy sector is one of the examples of market failure in which the balance point is not a maximization point for all groups; the balance point depends on the political and economic power across the groups. Some economists believe that stable conditions and growth in the Persian Gulf could help secure energy supply for the European Union (Correlje and Linde, 2006, p. 537). There are a variety of policies in major energy consuming countries to ensure energy supply security, but they have always emphasized that a domestic energy supply, technological changes and better facilitated transportation can reduce the risk of uncertain supply (of energy) in the West. It is believed that energy supply security in the contemporary times can be realized beyond merely reducing dependence on crude oil and natural gas. Energy supply security based on this view is defined as a condition in which the focus does not lie on promoting energy independence or reducing dependence of Persian Gulf States, but instead, on reducing the risks associated with this dependency (Mitchell, 2002, p. 263). After the oil crisis of the 1970s, energy security policies were changed in industrialized countries to policies of diversification, including diversification of energy sources and diversification of the source of crude oil imports.

3. EU Climate Change and Energy Policies

The acceptance of the UN Framework Convention on Climate Change (UNFCCC) by many member countries in 1994 was considered as a strong point for more fundamental measures in the future. The Convention on Climate Change forced industrialized countries to reduce greenhouse gas emission in order to match plans and policies to climate change, protection of food production, and sustainable economic development.

The first survey about the commitments of developed countries in terms of competence took place in the first meeting of the Conference of the Parties (COP) (1995, Berlin). In 1997, the conference concluded with the adoption of a protocol according to which industrialized countries were required to reduce their collective greenhouse gas emissions between 2008 and 2012 to at least 5% compared to their 1990 emission levels. The Kyoto Protocol was opened for signature on March 16, 1998 and after 90 days was ratified by at least 55 Parties to the Convention. In fact, in the Kyoto Protocol, industrialized countries were required to try to decrease the share of greenhouse gas emissions to (at least) 5% of their 1990 emissions between 2008 and 2012 (UNEP/IUC, 1998).

The European Commission bases its decisions on directions from the EU and world conditions. The EU Directives contain a section on Climate Change and Energy. The EU has set targets in the Europe 2020 strategy as well as the directions for following its plans. In the energy section, there is a program called "The 2020 package" that defines a set of binding legislation to help the EU in achieving its goals and targets on climate and energy. The package follows three important goals, including a 20% cut in greenhouse gas emissions (from 1990 levels), 20% of EU energy to come from renewables, and a 20% improvement in energy efficiency. These goals were made by EU leaders in 2007 and two years later came to be known as the legislation "Smart, Sustainable and Inclusive Growth," an important part of the Europe 2020 strategy. The EU has attempted to act in several areas for achieving these targets. As mentioned above, one of the policies on climate change is designed to decrease environmental problems in the EU region. The EU Emissions Trading System (ETS) plays as a key role for cutting greenhouse gas emissions. About 45% of greenhouse gas emissions in the EU are covered by the ETS with a goal of decreasing it to 21% lower than in 2005. The EU has another plan for sectors that are not in the ETS, including housing, agriculture, waste, and transportation (excluding aviation). In fact, the EU has additional plans to continue decreasing greenhouse gas emissions, such as building annual targets in comparison to 2005 under the "Effort Sharing Decision." A different target for each country was planned based on national wealth. This meant the program forced richer countries to cut a minimum of 20% in greenhouse gas emissions while permitting the least wealthy nations to increase them gradually until they reach the 20% limit. Even the least wealthy must plan to limit

their emissions. The EU Efforts concerning renewable energy are based on targets in this section; members must increase the energy consumed from renewable sources as a proportion of the total energy consumption. There was a big gap between members in terms of renewable energy consumption: about 10% energy in Malta and 49% in Sweden is derived from renewable energy sources. The share of renewable energy in the EU as a whole was 9.8% in 2010. The EU commission decided to raise it to 20% by 2020, that is, the EU wants to experience more than double the consumption between 2010 and 2020. The EU also planned to increase renewable energy in the transportation sector to 10% (EU 2020 Climate and Energy Package, 2009).

Energy efficiency is a variable that can play a key role in energy policies. The EU wants to improve energy efficiency because it thinks it will support its energy policies. Therefore, the EU has defined indicators as instruments for modifying energy efficiency in Europe.

“These include (EU 2020 Energy Efficiency Plan, 2009):

- An annual reduction of 1.5% in national energy sales
- EU countries making energy efficient renovations to at least 3% of buildings owned and occupied by central governments per year
- Mandatory energy efficiency certificates accompanying the sale and rental of buildings
- Minimum energy efficiency standards and labeling for a variety of products such as boilers, household appliances, lighting and televisions (Eco Design)
- The preparation of *National Energy Efficiency Action Plans* every three years by EU countries
- The planned rollout of close to 200 million smart meters for electricity and 45 million for gas by 2020
- Large companies conducting energy audits at least every four years
- Protecting the rights of consumers to receive easy and free access to data on real-time and historical energy consumption.”

Energy efficiency can be improved if suitable progress is brought about by policy makers. The Energy Efficiency Communication of July 2014 discussed that “the EU is expected to achieve energy savings of about 18%–19% by 2020, missing the 20% target by 1%–2%. However, if EU countries implement all of the existing legislation on energy efficiency, the 20% target can be reached without additional measures” (EU 2020 Energy Efficiency Plan, 2009).

The 2020 targets in the energy section are also important for the EU in other areas including energy security, employment, and growth because energy policies will help the EU to be more independent and/or decrease dependence on imported energy. Energy policies will create new job opportunities, increasing the employment rate in the EU member countries.

New objectives require new policies and programs that must be followed by each country. However, this article focuses on issues related to renewable energy. It is very important for all EU members to follow and attain all European Commission decisions and plans. This presents a challenge for candidates in joining the EU. As such, a survey of renewable energy policies can answer the following questions about the present and possible situation of all candidates, as well as Turkey. Firstly, what is the present situation of the candidate in comparison with other EU members and the EU targets? Secondly, is it possible for the candidate to achieve these goals by 2020? And finally, if yes, how can the candidate attain these goals? It should be mentioned that the present paper has surveyed only the first question to attain comparable statistics and data on renewable energy.

4. Renewable Energy Consumption in the EU

As mentioned above, all members in the EU should follow the European commission policies such as for climate change and energy that require members to make 20% of their energy consumption from renewable resources. Usually, different targets are defined for each member. For comparing the share of renewable energy consumption in the EU, members have been divided into three groups including:

- Group A: Countries² that have reached the target;
- Group B: Countries³ that may reach the target (less than 5% difference from the target in 2014); and

²Including Bulgaria, Czech Republic, Estonia, Croatia, Italy, Lithuania, Romania, Finland and Sweden.

³Including Belgium, Denmark, Germany, Greece, Spain, Cyprus, Latvia, Austria, Poland, Portugal, Slovenia and Slovakia.

- Group C: Countries⁴ that may not reach the target (more than 5% difference from the target in 2014).

Before surveying these groups, the average of renewable energy consumption in the EU is illustrated from 2004 to 2014, showing that the European region continued with renewable energy policies up till a 16% mark. It seems the region will reach the target in 2020. As it is indicated in Chart 1, the movement of EU members (on average) started from 8.5% in 2004 and rose to 16% in 2014, the rate has grown annually at about 6.57%.

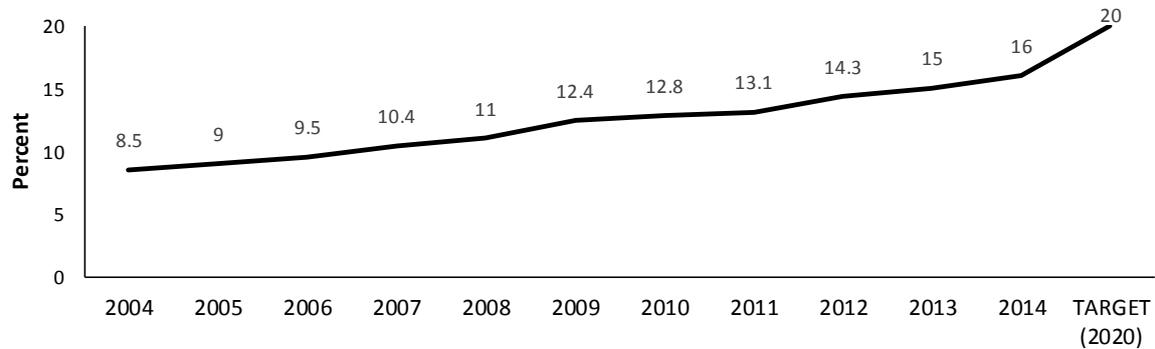


Chart 1. The Share of Renewable Energy consumption in the EU (%)

Source: Eurostat database

Table 1 shows the share of renewable energy consumption in Group A, the members that reached the target in 2014. Croatia was the first country to reach the target, followed by Sweden and Estonia, which exceeded the target in 2011. In 2012, Bulgaria and then one year later Lithuania, reached the target. The other members in this group reached the target in 2014.

Table 1. The Share of Renewable Energy Consumption in Group A (%)

	2009	2010	2011	2012	2013	2014	TARGET (2020)
Bulgaria	12.1	14.1	14.3	16	19	18	16
Czech Republic	8.5	9.5	9.5	11.4	12.4	13.4	13
Estonia	23	24.6	25.5	25.8	25.6	26.5	25
Croatia	23.6	25.1	25.4	26.8	28.1	27.9	20
Italy	12.8	13	12.9	15.4	16.7	17.1	17
Lithuania	20	19.8	20.2	21.7	23	23.9	23
Romania	22.7	23.4	21.4	22.8	23.9	24.9	24
Finland	31.4	32.4	32.8	34.4	36.7	38.7	38
Sweden	48.2	47.2	49	51.1	52	52.6	49

Source: Eurostat database

The share of renewable energy consumption in Group B is presented in Table 2. It identifies the members who must continue to follow their energy policies to reach the target. Based on their progress, Denmark, Greece, Spain, Latvia, Austria, Poland, Slovenia, and Slovakia will reach the goal while other members (Belgium, Germany, Cyprus, and Portugal) are likely to reach the target.

Table 2. The Share of Renewable Energy Consumption in Group B (%)

	2009	2010	2011	2012	2013	2014	TARGET (2020)
Belgium	5.1	5.5	6.2	7.2	7.5	8	13
Denmark	20	22.1	23.5	25.6	27.3	29.2	30
Germany	9.9	10.5	11.4	12.1	12.4	13.8	18
Greece	8.5	9.8	10.9	13.4	15	15.3	18
Spain	13	13.8	13.2	14.3	15.3	16.2	20
Cyprus	5.6	6	6	6.8	8.1	9	13
Latvia	34.3	30.4	33.5	35.7	37.1	38.7	40
Austria	30.2	30.6	30.8	31.6	32.3	33.1	34
Poland	8.7	9.2	10.3	10.9	11.3	11.4	15
Portugal	24.4	24.2	24.7	25	25.7	27	31
Slovenia	20	20.5	20.2	20.9	22.5	21.9	25
Slovakia	9.4	9.1	10.3	10.4	10.1	11.6	14

Source: Eurostat database

⁴Including Ireland, France, Luxembourg, Hungary, Malta, Netherlands and United Kingdom.

As Table 3 shows, the situation in Group C is different from the other groups. In this group, Ireland, France, Netherlands, and the United Kingdom show a big gap in reaching the target. This means these countries must attempt to reform energy policies in relation to renewable energy or grow faster than in their recent past. Other members in Group C may not reach the goals with the present trend but they must have a better situation in comparison to those mentioned above.

Table 3. The Share of Renewable Energy Consumption in Group C (%)

	2009	2010	2011	2012	2013	2014	TARGET (2020)
Ireland	5.1	5.6	6.6	7.1	7.7	8.6	16
France	12.1	12.6	11.1	13.4	14	14.3	23
Luxembourg	2.9	2.9	2.9	3.1	3.6	4.5	11
Hungary	8	8.6	9.1	9.6	9.5	9.5	14.65
Malta	0.2	1.1	1.9	2.9	3.7	4.7	10
Netherlands	4.3	3.9	4.5	4.7	4.8	5.5	14
United Kingdom	3.3	3.7	4.2	4.6	5.6	7	15

Source: Eurostat database

5. Renewable Energy and Turkey

Turkey is known as a natural energy bridge between the Middle East, the Caspian Regions (that have many energy resources) and the EU energy markets. Therefore, it seems that a development of this bridge can help and benefit both the EU and Turkey. Based on documents, the Turkish governments did not concentrate on the effects of energy policies on environment in the past (such as in the 1950s). There are three causes for this. Firstly, paying attention to environmental norms, setting policies, and implementing renewable energy are more recent phenomena (these regulations started in 2000s). In this area, more recent laws have helped to increase investments in renewable energy industries compared to the past. Secondly, the Turkish government did not play a key role in creating rules related to environment problems. There was no government support for this area. Finally, an additional reason comes from the structure of the Turkish government; the centralized government makes it difficult to make local governors decide on renewable energy investment and the needs of the local population (Çalışkan, 2013, P.70).

Some types of renewable energy are considered better sources in comparison to others and some areas or countries have more capacity for developing, producing and using them. Hydropower is one of the best renewable energy sources and one that has a large potential in Turkey. Studies illustrate that Turkey should increase development of the production of this kind of energy because Turkey can increase capacity of electricity thorough hydropower (Gök, 2013, P.66).

Turkey has created some laws that were barriers to investment in the renewable energy sector in the past. Actually, this area has faced three problems. One has been the role of the private sector in Turkish energy market. In fact, some evidence show that since the 2000s, the competitive situation has changed little. Another reason is that the regulations related to renewable energy have not been complete in all areas, meaning that there were not adequate laws and framework for the categories of renewable energy (for example, solar energy). The third reason is that the existing laws were not adequate to stimulate reform and improvement (Çalışkan, 2013, P.72).

The Ministry of Energy and Natural Resources of Turkey prepared a strategic plan (2015-2019) to approach the energy concerns for the country (based on the Law on Organization and Roles of the Ministry of Energy and Natural Resources (ETKB)) in two areas: firstly, to improve defense, security, welfare and the national economy in relation to energy and natural resources and secondly, to provide conditions in energy and natural resources sector to investigate, develop, generate and consume resources in a duly manner. A foregoing law refers to renewable energy directly. It has defined the role of the Ministry as follows:

“Involved with the studies in respect to the determination of the policies and strategies intended for enhancing energy efficiency and the evaluation of renewable energy resources and performing the studies in regard to the determination of these policies and strategies” (ETKB, 2013, P. 14).

Also, there is another strategic plan called the “Energy Efficiency Strategy Paper from 2012 to 2023” which, in the long run, will play a key role for Turkey. This document specified some strategic goals for energy efficiency. One goal is concentrated on renewable energy in the building sector; it states below:

“To decrease energy demand and carbon emissions of buildings; to promote sustainable environment-friendly buildings using renewable energy sources” (ETKB, 2012, P. 10).

The government in Turkey has attempted to improve the share of renewable resources in the total energy supply by creating laws (such as the Law on Usage of Renewable Energy Sources as Electricity Energy Production,

2005 and 2011, and the Geothermal Sources and Natural Mineral Water Law) but results illustrated they have not increased development renewable energy investment a great deal (Erdoğan, 2007, P.1).

The Turkish government has set goals related to the renewable energy sector that attempt to increase the role of renewable energy. Documents from the Ministry of Energy and Natural Resources show that the government and policy makers are paying more attention to the number of hydropower plants and to the use of hydropower. In the strategic plan for 2023, it is announced that electricity produced by renewable sources should be increased to 25% by 2020 (ETKB, 2013, P. 14).

Hydroelectric power plants played a key role in renewable resource investment in Turkey and many investors are showing growing interest in them. Another alternative is wind power. The first wind facilities were started in 1998 (GENI, 2001, P. 5) and since then, the regulation framework has come to motivate investors.

Some studies show that the Turkish renewable sector has three main problems; 1) the hydropower sector has more financial and technological facilities and it is not very environmentally friendly; 2) geothermal energy, although known as a fine and cheap source, is not applied a great deal; and 3) the lack of regulations and financial support for new sources of renewable energy (Çalışkan, 2013, p.77).

Fossil fuels are the most important source of energy in the Turkish energy system and unfortunately, they are not suitable for sustainable development. Based on the Ministry of Energy and Natural Resources (ETKB), Turkey's goals are as follows: "It is our mission to ensure efficient, effective, safe, and environmentally-sensitive use of energy and natural resources in a way that reduces external dependency of our country, and makes the greatest contribution to our country's welfare" (ETKB, 2013). Renewable resources in Turkey include solar energy, biomass energy, geothermal energy, wind energy and hydropower that can be used in many areas (especially for heating purposes and generating electricity). For example, the share of renewable energy sources in electricity consumption was about 25% in Turkey in 2012 and, as mentioned above, hydropower was the most employed renewable energy source (DEK-TMK, 2013).

Solar energy can provide electricity and Turkey has a high potential for solar energy based on its geographical position. Studies illustrate that the Turkey experiences an average annual sunshine duration of about 2640 hours (with a daily total of 7.2 hours) (ETKB, 2010). Biomass comes from living or recently living organisms, however much of this energy currently comes from non-sustainable sources (Natural Resources Defense Council (NRDC, 2013). Actually, biomass is separated into two kinds, traditional and modern. As mentioned, the traditional type is not environmentally friendly, but modern biomass is produced in more sustainable ways (Benefits of Recycling, 2013). Recently, researchers have stated that traditional biomass should not be considered renewable energy because is not a replaced sourced (Goldemberg and Coelho, 2004, P. 711). Using modern biomass, studies estimate that Turkey has a potential of about 90 billion KWh/year (Karayılmazlar et al, 2011, P. 69) of production. Geothermal energy is derived from hot water, steam, dry steam, and hot dry rocks. This resource can be found near active fault systems, volcanic and magmatic units (ETKB, 2010). Until 2013, there were about 190 geothermal fields in Turkey found by the General Directorate of Mineral Research and Exploration (MTA). The economic potential in geothermal energy for Turkey is estimated about 1.4 billion KWh/year (Cebeci, 2005, P. 78). Geothermal energy, in comparison to other resources, plays another role for Turkey because it has uses in thermal tourism, heating applications, the obtaining of industrial minerals and in electricity production (MTA, 2012). Wind energy is another renewable source, obtained from the movement of the wind across the earth. It is related to solar processes (YEGM, 2012). In this area, many economic studies show that Turkey has a great potential for wind energy, about 50 billion KWh/year (Cebeci, 2005, P. 76). Research and feasibility studies have discussed that there are around 5000 MW, as minimum wind energy, in regions (with annual wind speed of 8.5 m/s and higher) and 48,000 MW (with wind speed higher than 7.0 m/s) (ETKB, 2010). Hydropower is another renewable energy that is known as an important element in the Renewable Portfolio Standard (RPS) and has caused increasing production of energy from renewable sources (NREL, 1997). Hydropower potential in Turkey is about 433 billion KWh/year and the economic potential is estimated at around 140 KWh/year (YEGM, 2012).

Chart 2 compares the average cost of renewable energy production per kWh in 2010 and 2015. The costs of electricity that is produced are shown in gray with horizontal bands of fossil fuels located within. Accordingly, the production cost of electricity from fossil fuel per kWh changed between 0.05 USD and 0.14 USD.

As a comparison, hydropower costs, on average, were stable at USD 0.046. Onshore wind costs declined from 0.071 USD to 0.060 USD while offshore wind costs were 0.157 in 2010 and increased to 0.159 USD in 2015. The most important cost reduction was experienced in the solar PV area, with a decline of USD 0.126 to USD 0.285. Similarly, solar thermal energy investment costs decreased from 0.245 USD to 0.331 USD. Biomass costs

changed from USD 0.056 to USD 0.055, but geothermal energy investment costs went up from 0.071 to USD 0.80 per kWh (Based on IEA definition, solar photovoltaics (PV), solar thermal electricity and solar heating and cooling are the kinds of solar technologies which solar photovoltaic (PV) systems directly convert solar energy into electricity).

Overall, among sources of renewable energy, hydropower, biomass, onshore wind and geothermal costs have remained at the level of fossil fuels costs. The structure of cost in electricity production per capita, especially in developing countries, is one of the most important elements for determining the direction of investment in renewable energy sources. Renewable energy sources with lower production cost cause increased consumption, and Turkey is an example of this phenomenon. The desire to join international agreements, such as those for climate change, is another factor for using renewable energy sources.

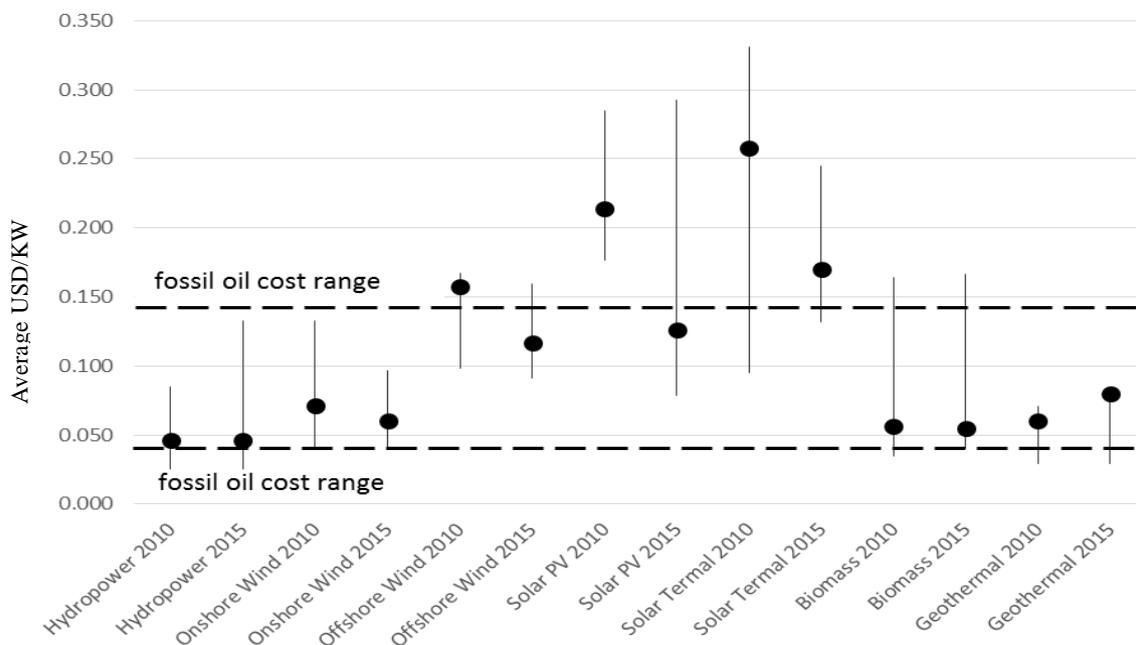


Chart 2. Trends in Global RE Levelled Cost of Electricity 2010–2015 (Ranges and Weighted Averages)

Source: International Renewable Energy Agency (IRENA)

It has emerged more clearly which costs of renewable energy sources have risen for Turkey in 2010 and 2015. Turkey's renewable energy capacity was 17.369 MW in 2010, while it rose to 31.704 MW in 2015. The highest increase in installed capacity experienced the highest cost reduction (26%), which was in the solar and wind energy areas. The increase in the cost of fossil fuels should be added as a part of this cost.

Table 4. Turkey's Renewable Energy Capacity and Cost

	CUMULATIVE INSTALLED CAPACITY (MW)			COST (USD/KWH)		
	2010	2015	Artış	2010	2015	Artış
Hydropower	15831	25867	63%	0.046	0.046	0%
Bioenergy	118	261	121%	0.056	0.055	-2%
Geothermal	94	623.9	564%	0.071	0.080	13%
Solar	5.7	248.8	4265%	0.331	0.245	-26%
Wind	1320	4694	256%	0.071	0.060	-15%
TOTAL	17369	31704	83%			
Fossil fuel				0.040	0.140	

Source: International Renewable Energy Agency (IRENA)

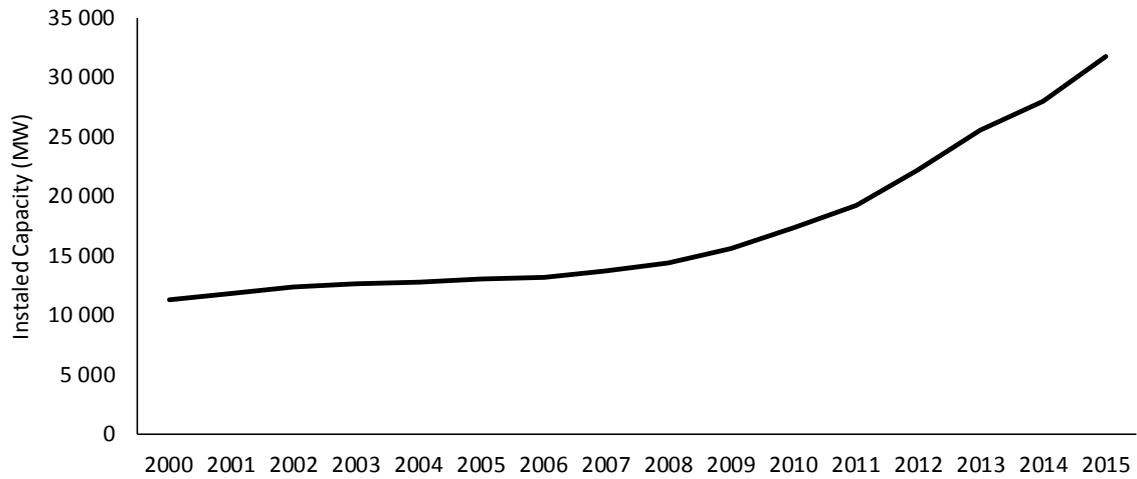


Chart 3. Renewable Energy Power Capacity and Electricity Generation

Source: International Renewable Energy Agency (IRENA)

Also in Eurasia, wind and solar energy costs should be added because they are lower than in other parts of the world (see Chart 4).

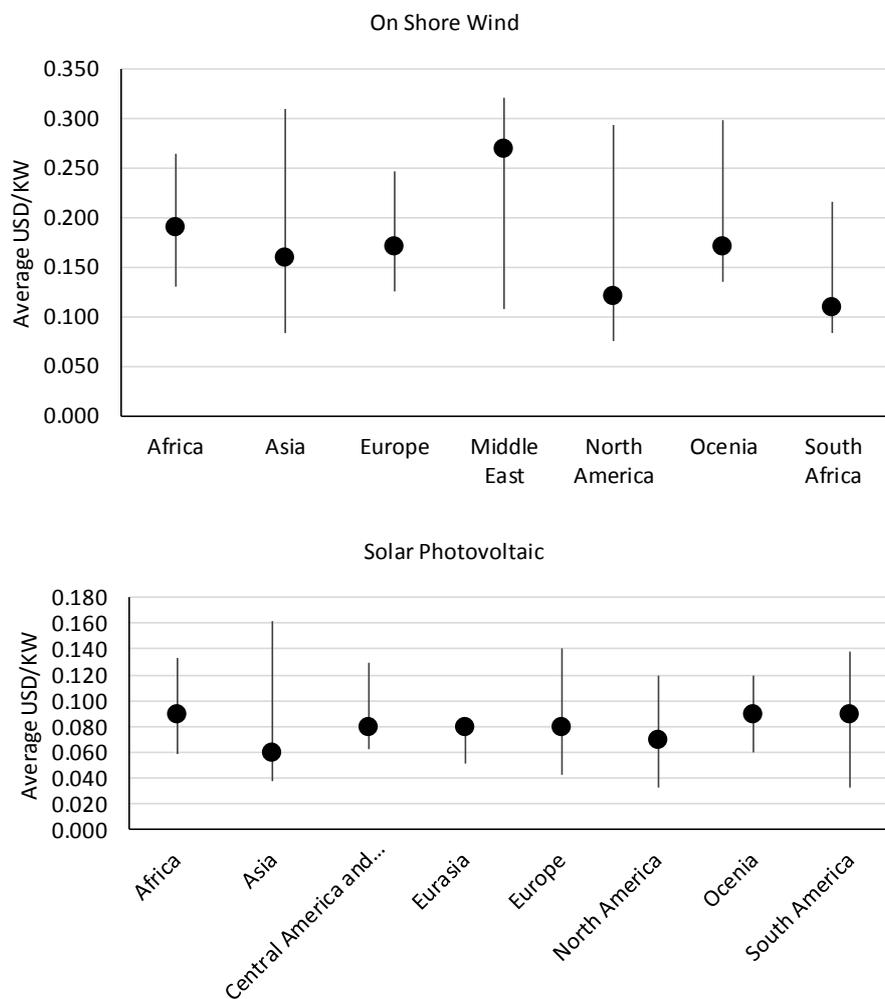


Chart 4. Wind and Solar Energy Costs in 2014

Source: International Renewable Energy Agency (IRENA)

As mentioned above, Turkey has plans to improve the situation of renewable resources in the energy sector. Chart 5 illustrates that Turkey, as a country that desires to join the EU, has defined about 20.5% for its share of renewable energy consumption in 2023. In fact, based on Turkish National Renewable Energy Action Plan (YEEP), the share of this kind of energy should increase from 13.92 in 2013 by about 3.9% annually.

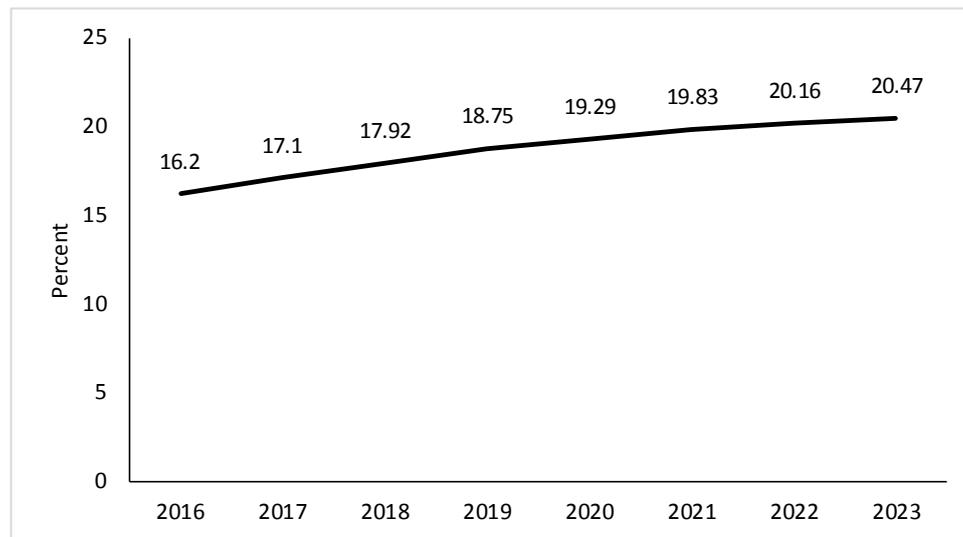


Chart 5. Target of Gross Final Energy Consumption in Turkey (%)
(Energy produced from renewable sources)

Source: Turkish National Renewable Energy Action Plan, 2014.

6. Conclusion

Generally, the EU has attempted to initiate effective policies including positive initiatives on climate change and energy. Energy is an important subject for the world's economists and policy makers because it can be a variable that plays a key role in politics and economics. Renewable energy is environmentally friendly and can decrease a country's or region's dependence on imports to meet its energy needs. The European Union as a powerful region of the world, has concentrated on renewable energy as a strategic subject that can help the EU in two ways; firstly increasing local energy production, and secondly, decreasing dependence on imported energy.

This paper surveyed EU policies in the energy sector and, after illustrating the share of renewable energy consumption in the EU, reviewed energy data in the EU that illustrated two conclusions; firstly, the policy package was created based on real conditions, and secondly, the targets were reachable. Based on the data, the present situation in renewable energy for the EU is near to target (set for 2020) because the share of renewable energy consumption was 16% in 2014. It seems that the European Commission target of 20% can be approachable during the six years. This study classifies EU members into three groups: countries that have reached the target are Group A; countries that may reach the target (having less than a 5% difference with target as of 2014) as Group B; and countries that may not reach the target (having more than a 5% difference with target as of 2014) as Group C. Data illustrate that reform may be necessary for four members in Group C (Ireland, France, Netherlands and the United Kingdom) because they are far from the renewable target.

The next section looked at the renewable energy standards of Turkey as a candidate for joining the EU. As mentioned previously, there are some main problems for renewable energy in Turkey. One of these is the attractiveness of hydropower, which can actually be unsuitable for as a green environment. In contrast to hydropower, geothermal energy is environmentally friendly, but does not have a remarkable share of the energy sector in Turkey. Research shows Turkey is in a strong geographical position for wind and solar energy, however, there are not enough users available or laws to regulate these sources at this time. Our studies show that the government's support and encouraging plans in these kinds of renewable energy had been less than expected. Therefore, policy makers in the energy sector should pay more attention to new plans and projects (especially the development of solar and wind programs) in Turkey to increase the role of renewable resources in energy supply. The Turkish government has a duty to follow and survey a strategic plan in the energy sector because Turkey desires to improve its renewable energy production in ten years from 2013 to 2023, according to the Turkish National Renewable Energy Action Plan (YEEP) According to this plan, the Turkish government must follow the trends of renewable resources with targets at the end of 2018 (in the middle of the plan). It is so soon to discuss

the success or failure of this plan because strategic plans are considered long-run issues that need a long time to review and consider.

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